

given age of husband ; (b) frequency of incidence of scarlet fever at different ages ; and (c) frequency of "lips" in the Medusa *P. pentata*.

It is perhaps of some philosophical interest to note that solutions of (i) that had escaped the analytical investigation were first obtained from actual statistics which could not be fitted to any of the curves of my first memoir without imaginary values of the constants. So great was my confidence in (i), however, that before I discarded it I re-investigated my analysis of it, and was so led to these two additional solutions.

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"On the Structure and Affinities of *Dipteris*, with Notes on the Geological History of the Dipteridinæ." By A. C. SEWARD, F.R.S., University Lecturer in Botany, Cambridge, and ELIZABETH DALE, Pfeiffer Student, Girton College, Cambridge. Received May 21,—Read June 20, 1901.

(Abstract.)

The generic name *Dipteris* instituted by Reinwardt in 1828 is applied to four recent species—*Dipteris conjugata* (Rein.), *D. Wallichii* (Hook. and Grev.), *D. Lobbiana* (Hook.), and *D. quinquefurcata* (Baker). *Dipteris Wallichii* occurs in the sub-tropical region of Northern India ; the other species are met with in the Malay Peninsula, Java, New Guinea, Borneo, and elsewhere. It has been customary to include *Dipteris* in the Polypodiaceæ, and to describe the sporangia as having an incomplete vertical annulus. The authors regard *Dipteris* as a generic type which should be separated from the Polypodiaceæ and placed in a family of its own—the Dipteridinæ, on the grounds that (1) the sporangia of *Dipteris* have a more or less oblique annulus ; (2) the fronds possess well marked and distinctive characteristics ; (3) the vascular tissue of the stem is tubular (siphonostelic), and not of the usual Polypodiaceous type.

For the material from Borneo and the Malay Peninsula, on which the anatomical investigation of *Dipteris conjugata* is based, the authors are indebted to Mr. R. Shelford, of Sarawak, and to Mr. Yapp, of Caius College, Cambridge. The fronds of the four species of *Dipteris* consist of a long and slender petiole and a large lamina, in some cases 50 cm. in length ; in *D. conjugata* and *D. Wallichii* the lamina is divided by a deep median sinus into two symmetrical halves, but in *D. Lobbiana* and *D. quinquefurcata* the symmetrical bisection of the lamina is less obvious, the whole leaf being deeply dissected into narrow linear segments. The sori, which are without an indusium, consist of numerous sporangia and filamentous paraphyses, terminating in glandular cells. The sporangia are characterised by the more or less

oblique annulus, and by the small output of bilateral spores. The sporangia of the same sorus are not developed simultaneously.

*Anatomy.*—The horizontal creeping rhizome, which is thickly covered with stiff ramental scales, contains a tubular stele limited both internally and externally by a definite endodermis. The xylem is mesarch in structure; the protoxylem groups of spiral tracheids occur in association with a few parenchymatous cells at regular intervals in a median position. At the point of origin of each leaf the tubular stele opens, and becomes U-shaped in section, the detached portion passes into the petiole as a horseshoe-shaped meristele of endarch structure. The meristele alters its form a short distance below the origin of the lamina, and becomes constricted into two slightly unequal portions; from the lower end of one of these a small vascular strand is gradually detached, and at a higher level a similar strand passes off from the other half of the stele. During their passage into the main ribs of the lamina the vascular strands, which are at first simply curved, become annular, and assume the form characteristic of *Marsilia*. The slender and branched roots are traversed by a triarch stele.

*Geological History.*—The genus *Dipteris* represents a type which had descended from the Mesozoic period with but little modification. The genera *Dictyophyllum* and *Protorhipis* are regarded as members of the Dipteridinae, which were widely distributed in Europe during the Rhætic and Jurassic periods. Records of these fossil forms have been obtained from England, Germany, France, Belgium, Austria, Switzerland, Bornholm, Greenland, and Poland; also from North America, Persia, and the Far East. The genus *Matonia*, especially *M. pectinata* (R. Br.), possesses certain features in common with *Dipteris*, and this resemblance extends to the fossil types of the Matonineae and Dipteridinae. *Matonia pectinata* and *Dipteris conjugata*, growing side by side on the slopes of Mount Ophir in the Malay Peninsula, survive as remnants from a bygone age when closely allied ferns played a prominent part in the vegetation of northern regions.

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“The Nature and Origin of the Poison of *Lotus arabicus*.” By WYNDHAM R. DUNSTAN, M.A., F.R.S., Director of the Scientific and Technical Department of the Imperial Institute, and T. A. HENRY, B.Sc., Salters’ Company’s Research Fellow in the Laboratories of the Imperial Institute. Received May 30, —Read June 20, 1901.

(Abstract.)

The authors have already given a preliminary account\* of this investigation and have shown that the poisonous property of this

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